The RATSletter

Estima

RATS Version 6.02

Version 6.02 of RATS is now available for Windows, Macintosh, UNIX, Linux, and UNIX for Mac OS X.

Users with current maintenance contracts will automatically receive the update on CD, including updated Help files and a PDF file describing the new features.

Licensed WinRATS 6.0/6.01 users who do not have a maintenance contract can: (a) order a maintenance contract, (b) order a copy of the 6.02 update on CD for $15, or (c) download the update from our website (**www.estima.com/patches.shtml**). Note that the download does not include the updates to the Help files, or the PDF document.

If you haven't yet updated to Version 6, you are missing out on a huge variety of improvements. See our website for details on Version 6.

Improvements to Existing Instructions

Here are some of the enhancements in Version 6.02:

A STARTUP option is now available on **DLM**. This can rather considerably speed up estimation with **DLM** when you have matrices that are fixed over time but depend upon free parameters. If, for instance, you need a formula for the A matrix, a startup formula which says AMAT=AFRML(1) will allow you to use A=AMAT on the **DLM** options. With this, AMAT will be computed just once per function evaluation, rather than at every time period.

Also, the STARTUP option (available with **DLM**, **MAX-IMIZE**, **NLLS**, and **NLSYSTEM**) now accepts formulas of any type, rather than just real-valued formulas.

DLM and **FIND** now have PMETHOD and PITERS options like those available on the other nonlinear estimation instructions. These allow you to have RATS do a preliminary estimation method, such as SIMPLEX, for a specific number of iterations before switching to the main estimation technique for final estimates. The Version 6 documentation erroneously indicated that PMETHOD and PITERS were available for **FIND**, but they were not actually added until this 6.02 release.

The FIRST option on **SET** and **CSET** will now accept a formula as the argument.

NLSYSTEM now offers a FRMLVECT option, which accepts a VECTOR of FRMLS as an alternative to supplying the list of formulas as parameters.

REPORT now has UNIT and FORMAT options, which allow you to directly export the report to a file in various formats. Also, you can now use the ALIGN option with ACTION=FORMAT, as well as with ACTION=MODIFY.

SUR now has MODEL, RESIDS, and COEFFS options. These allow you to estimate a MODEL of equations, and make it easier to save the residuals and coefficients into series.

TEST now has COVMAT and COEFFS options, which make it easier to implement Hausman tests.

GSET and **EWISE** can now handle expressions with embedded commas.

New Functions

Version 6.02 provides 15 new functions, including:

%BLOCKDIAG: Creates a block diagonal matrix

%CXSVD: Complex singular value decomposition

%DIGAMMA, %TRIGAMMA: Compute the Di and Tri-Gamma functions.

We've Moved!

On January 15th, Estima moved into new office space, a few blocks down the street from our old location. Our new address is:

Estima
1560 Sherman Ave, Suite 510
Evanston, IL 60201

Phone and fax numbers and all other contact information remain the same (see back page).

We have moved to a much larger building with more amenities, including meeting room facilities and a cafeteria, that will allow us to offer more frequent in-house training sessions.

Contents

New Procedures and Example Programs

We've posted many new procedures on our web site recently—see below for a list of the most recent additions. To download these procedures, go to our website at **www.estima.com**, and click on "Procedures and Examples" on the menu on the left side of the screen.

These files, and more than 100 others, are available in the "Procedures and Examples" sub-section. You may also want to explore the "Textbook Examples" section, which provides RATS programs for the examples from a variety of popular econometrics textbooks, including the recent additions from Pindyck and Rubinfeld and from Verbeek, described on page 3 of this newsletter.

Note that the Search facility on the website can also be helpful in locating a procedure or example for a particular technique.

ADFAUTO.SRC does automatic lag selection for an augmented DF unit root test, using one of four criteria. This is based loosely on a section of Norman Morin's ADF procedure.

ARMASPEC.SRC produces a graph of the spectral density for an input ARMA model where the model is in the form of an equation.

BDSTEST.SRC performs the Brock–Decher–Scheinkman test for i.i.d.

CLARKFORETEST.SRC performs the forecasting comparison tests from Clark and McCracken, "Tests of Equal Forecast Accuracy and Encompassing for Nested Models," *Journal of Econometrics,* 2001, vol 105, pp. 85–110. This was written by Taisuke Nakata and Todd Clark of the Federal Reserve Bank of Kansas City.

CNDITION.SRC is an updated version of the procedure included with RATS. This allows more general linear constraints on the values of future endogenous variables.

EBA.SRC performs the calculations from Granger and Uhlig, "Reasonable Extreme Bounds Analysis", *Journal of Econometrics*, 1990, vol 44, pp. 159–170. The original version of this was written by Harald Uhlig.

EGTEST.SRC performs an Engle–Granger test for cointegration.

GREGHANS.SRC implements the Gregory–Hansen cointegration test, from "Residual-based Tests for Cointegration in Models with Regime Shifts", *Journal of Econometrics* (1996). The cointegrating regression is allowed to have a level break, a full structural break, or a trend with a level break.

IPSHIN.SRC implements tests from Im, Pesaran and Shin, "Testing for Unit Roots in Heterogeneous Panels", *Journal of Econometrics*, 2003, vol 115, pp 53–74.

JOHMLE.SRC does the initial analysis (calculation of the eigenvalues and test statistics based upon them) in the Johansen ML cointegration procedure.

MVBNDECOMP.SRC computes a multivariate Beveridge–Nelson decomposition of a set of series via a vector autoregression, as described in Arino and Newbold, "Computation of the Beveridge–Nelson Decomposition for Multivariate Economic Time Series", *Economic Letters*, 1998, vol 61, pp. 37–42.

SSMSPECTRUM.SRC computes the (multivariate) spectral density of a state space model with time invariance transition matrices.

VARSPECTRUM.SRC computes the multivariate spectral density of a Vector Autoregression given an estimated model and covariance matrix.

Replicating Results from Papers

We've added a new section on the Procedures and Examples pages, entitled "Paper Results", where we will post programs and data that reproduce results from econometrics papers.

Here are the first two examples to be posted:

TSE.PRG does the Tse LM test for constant correlation in a multivariate GARCH model. See Tse, Y. K. (2000), "A Test for Constant Correlations in a Multivariate GARCH Model", *Journal of Econometrics* 98, pp. 107–127.

WATSON_JPE.PRG replicates much of the analysis from Watson (1993), "Measures of Fit for Calibrated Models", *Journal of Political Economy*, vol 101, pp. 1011–1041. In addition to demonstrating the calculation of Watson's measures of fit, it also demonstrates methods for solving DSGE's. See the article on page 3.

If you have written your own programs to replicate the results of a paper and would like to share them with the RATS community, we invite you to send the programs and data files to us, and we will be happy to post them on our site.

GARCH Instruction Documentation

The description of the **GARCH** instruction in the Version 6 *Reference Manual* omitted the VARIANCES option, which allows the user to specify the form of the univariate variances used for MV–GARCH with diagonal, CC or DCC covariance matrices. The option is:

VARIANCES=[SIMPLE]/VARMA/EXPONENTIAL

This is described in the *User's Guide* on the top of page 416.

See our website for a full listing of Version 6 documentation errata.

Pindyck and Rubinfeld Examples

We've posted RATS programs for the examples from Pindyck and Rubinfeld, *Econometric Models and Economic Forecasts, 4th ed* from McGraw-Hill. Note that you should download the Zip file that includes the data files, as several of the data files needed to be fixed from the ones provided with the book. The textbook examples are found on the web site at **www.estima.com/procs_pindyck.shtml**.

A Guide to Modern Econometrics
by Marno Verbeek

Marno Verbeek's *A Guide to Modern Econometrics* is a recent addition to the collection of econometrics texts available for purchase through Estima. The book is wide-ranging guide to the current practice of econometrics, demonstrating topics such as cointegration, Generalized Method of Moments, limited dependent variable and panel data techniques, through carefully worked examples with real world data.

Verbeek writes that the focus here is on "what is important for doing and understanding empirical work. This means that the text is a guide to (rather than an overview of) alternative techniques. Consequently, it does not concentrate on the formulae behind each technique" but rather "the intuition behind the approaches and their practical relevance."

We have posted RATS programs for many of the worked examples from the book on our web page. The direct link is:

www.estima.com/procs_verbeek.shtml

or just go to **www.estima.com**, click on "Procedures and Examples", and then "Textbook Examples".

Estima's price for the book is currently $50 (including shipping). See our website or contact us to place an order.

Solving DSGE's with RATS

The last newsletter mentioned that we had added the instruction **QZ** to RATS 6.01 for doing the QZ decomposition of a pair of matrices. QZ is used in the method for solving linear (or linearized) rational expectations models described by Sims in "Solving Linear Rational Expectations Models", *Computational Economics*, 2002, vol 20, pp 1-20.

The file DSGETOOL.SRC includes several procedures which are helpful for solving DSGE's using Sims' technique. The one that is called directly is

@SimsSolve(options) g0 g1 c

This computes the solution to a linear rational expectations model input in the canonical form:

$$G_0 Y_t = G_1 Y_{t-1} + c + \Psi z_t + \Pi \eta_t \,,$$

where z is a random disturbance and η_t is an expectational error satisfying $E(\eta_{t+1}|t)=0$.

The G_0 and G_1 matrices are input as the first two parameters. The c parameter is optional. Ψ and Π are input using options PSI and PI. The one additional input to the procedure is via the option CUTOFF=*cutoff value for explosive roots*. This separates the roots into those which must be solved forward and those which are solved backwards. The default for CUTOFF is 1.0.

The output from SimsSolve is the set of matrices (obtained with options T1, T0 and TC) for the state space formulation

$$Y_t = T_1 Y_{t-1} + T_c + T_0 z_t$$

T_C is purely optional—if you don't provide a c, T_C won't be computed.

There are several worked examples for simple linear rational expectations models on the file DSGETEST.PRG. A much more involved example is provided in WATSON_JPE.PRG, which is a replication file for Mark Watson's 1993 JPE paper on measures of fit. Among other things, this shows code for working with a model which is log-linearized around a steady state.

Watson uses the well-known KPR (King, Plosser and Rebelo) model. This example includes a procedure for generating the log-linearized version of this, and a routine for finding the steady state using numerical methods if (as is not true in this case), a closed form solution is difficult or impossible to construct.

Barcelona Conference

The Centre de Recerca en Economia Internacional (CREI) in Barcelona is hosting a conference that may be of interest to RATS users, particularly those working with VAR models. CREI is located on the campus of the Universitat Pompeu Fabra (UPF) in Barcelona (near the beach, according to the website!).

The conference will be held April 1st and 2nd, and is entitled "Macroeconomics and Reality, 25 years later". The title refers to Chris Sims' influential 1980 *Econometrica* article "Macroeconomics and Reality", and Sims is scheduled to be one of the presenters. (Not coincidentally, 2005 will also be the 25th anniversary of VAR Econometrics, the predecessor of Estima).

The conference organizers are Fabio Canova, Harald Uhlig, Tao Zha, Eric Leeper and Albert Marcet. There may be a limited number of places available for additional attendees. For more information, please see:

www.econ.upf.edu/crei

and click on the link entitled:

CREI Conference on "Macroeconomics and Reality"

If you are interested in attending, we recommend that you contact Fabio Canova to make sure there is still space available. Fabio's email address is: fabio.canova@uni-bocconi.it

RATS 6.02, *continued from 1*

`%EQNVARIANCE`: Returns the variance of an equation

`%FILL`: Dimensions a matrix and fills all entries with a fixed value.

`%INVGED`, `%LOGGEDDENSITY`: Inverse and log density for the GED distribution

`%PANELOBS`: Returns the number of periods per individual for panel data

Wizards
Wizards have been added for the instructions **GARCH** and for **DDV** and **LDV** (discrete and limited dependent variables).

Bug Fixes
The most significant fixes involved some issues with the editor that could cause RATS to crash while editing text, especially when selecting and deleting blocks of text. We recommend that anyone using 6.0 or 6.01 update to 6.02. Other fixes resolve platform-dependent problems with the **EIGEN** command and the `%CORR` function. See our website for a complete list of bug fixes.

Applied Econometrics Text in French
Uses RATS for Examples

Those of you interested in a French language applied econometrics textbook may want to take a look at *Économétrie appliquée*, by Cadoret, Benjamin, Martin, Herrard, and Tanguy.

According to the authors, "the aim of the book is to introduce students to applied econometrics, including basic techniques and some extensions of the single linear equations (system of equations, panel data models)." The book also includes examples on current methods used in applied econometrics, including time series analysis, and the analysis of qualitative and limited dependent variable models. Each application presents the relevant economic theory and engages the reader to do exercises by himself.

For more information, see the following page on the publishers website:

universite.deboeck.com/livre/?GCOI=28011100829780

or see Prof. Cadoret's home page, which includes links to the RATS example programs and data sets:

perso.univ-rennes1.fr/isabelle.cadoret-david/ LivreEconometrie/index.htm

Maintenance Contracts

We're again offering "maintenance contracts" for those who wish to receive their updates to RATS automatically. For single-user licenses that have already been updated to version 6 the cost is $200 for the standard version or $250 for the Pro (plus a shipping charge for those outside the continental U.S.). This provides all updates up to and including Version 7. You can obtain information about ordering this on the web site.

Need to Budget on an Annual Basis?
We've heard from quite a few of our customers at larger institutions that they would prefer to have maintenance contracts priced on an annual basis, as they would find that easier for budgetary purposes. If you have a network license or large groupings of single licenses that you would like to keep up-to-date, please contact us for pricing.